

## United States Department of Agriculture,

## DIVISION OF AGROSTOLOGY,

[Grass and Forage Plant Investigations.]

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APR 3 1901

## BERMUDA GRASS. U. S. Department of Agriculture.

Bermuda grass (*Cynodon dactylon*) is well known throughout the Southern States. It is a native of tropical regions of the East, and was introduced into the United States at an early period. It has since spread over the region from Maryland to Missouri and Texas, and is locally abundant from New Mexico to southern California. Although its name would indicate that it came from the Bermudas, it is well known in Europe, and is thought to have originally come from Southern Asia. Bermuda grass is said to have been first noticed in this country about 1825 by General Bethune, of Georgia, who planted it in many places throughout the South.

There are many local names for Bermuda, among which are reed grass, scutch grass, Bahama grass, and, in the region of Washington, wire grass. In Australia it is called couch grass.

It is a standard grass in the South, but can not be grown successfully north of Virginia and Oklahoma.

FIG. 1.—Bermuda grass (*Cynodon dactylon*).

## DESCRIPTION.

Bermuda grass is a low perennial grass, spreading extensively by creeping stems. These stems may be on the surface of the soil, or commonly more or less buried, sometimes to the depth of several inches. Under favorable circumstances they may extend 5 or 6 feet with lateral branches of a foot or more. At intervals of an inch or two, roots are produced, and usually a leafy stem is thrown up to the height of a few inches. The flowering stems are upright, naked above, and have the flowers in slender, one-sided spikes at the summit. (See fig. 1.) These spikes are from 1 to 2 inches in length, and are in clusters of four or five, although there may be more or fewer, according to conditions under which the grass grows.

Where it obtains a foothold, Bermuda grass spreads with rapidity, and in exposed situations tends to drive out other vegetation. It does not thrive in the shade, but will endure great extremes of heat and drought. It adapts itself to a great variety of soil conditions, growing on sand, clay, black loam, or even on strongly alkaline soils; and will endure a large amount of moisture or even inundation. It does not usually produce fertile seed in the United States, except in the extreme South. The seed upon the market is mostly imported from the West Indies or other tropical regions. Professor Toumey reports that it seeds abundantly in Arizona, and occasional plants with apparently mature seeds have been found as far north as Philadelphia.

## ST. LUCIE GRASS.

This is a variety of Bermuda grass which is much used in Florida and somewhat elsewhere as a lawn grass. It differs from Bermuda in having the propagating stems more upon the surface of the soil and in the lighter green color of its foliage. It is said to be more resistant to frost and to keep green in winter longer than Bermuda. It is reported to have withstood a temperature of 10° below zero in Tennessee and to remain green through heavy frosts. This variety has been grown successfully upon the grounds of the Department of Agriculture, surviving the severe winter of 1898-1899.

## BERMUDA AS A PASTURE GRASS.

Bermuda is the most valuable of all the grasses for pasture in the South. It will stand trampling of stock, is very nutritious, and thrives on soils too poor for the successful cultivation of other crops. It is preeminently a summer grass, the length of its season depending upon the latitude. In Mississippi it furnishes grazing from the middle of May to the middle of November. In the Gulf States, where grazing is desired through the entire season, it is recommended

to combine Bermuda with bur clover (*Medicago maculata*). In this case the Bermuda sod is scarified about September 1 with a cut-away or disc harrow, and 15 to 20 pounds of bur clover sown per acre. The clover grows during the winter and disappears in the spring when the Bermuda appears.

In California Bermuda grass has obtained a foothold in the southern part of the State and thrives on all kinds of soil. Mr. Leckenby reports that it furnishes feed during nine months of the year, and recommends it for land not suited for other purposes. When other grasses are mixed with Bermuda, these are likely to be replaced by the latter when subjected to continued grazing, especially on poor soils. Professor Tracy, of Mississippi, states that Bermuda and Japan clover should be the foundation of pastures, especially upland, through the Gulf States. On the black soils of Mississippi and Alabama he recommends that sweet clover be added. In the course of a few years a Bermuda pasture becomes somewhat sod-bound. To renovate such a pasture and keep it in good condition, it should be plowed and harrowed in the spring every three to five years.

#### BERMUDA GRASS FOR HAY.

On fertile soil the growth becomes very luxuriant, and may reach a height of 2 feet or more. It can be cut two or three times during a season, and yields a nutritious hay of high feeding value. The yield under favorable conditions may be as much as two to four tons per acre, and even as high as ten tons during the season is reported.

The following treatment is recommended by Professor Tracy:

"After the last cutting in the fall, plow the land and sow with oats or vetch, or a mixture of the two. The soil should be thoroughly harrowed both before and after the sowing, and if possible smoothed off with a heavy roller, in order to give a level surface for mowing. The oats and vetches give a crop of hay in May, and by October the Bermuda may be cut."

Red clover is often sown when Bermuda is first planted, in order to increase the yield of hay. Like other grasses, it responds readily to the application of stable manure or other fertilizers.

#### FORMATION OF PASTURE OR MEADOW.

The grass may be started from seed or cuttings of the creeping stems. To start a pasture from seed the ground should be carefully prepared and sown in early spring with good seed at the rate of 6 to 8 pounds per acre, and pressed in with a roller. If sown just before a rain the rolling is unnecessary. The seeds are small (about 118,000 to the ounce), and should not be covered too deeply. Trials on the Potomac Flats at Washington, D. C., using 20 pounds of seed per acre, gave excellent results. Less quantity of seed may be used, but

the stand is not so likely to be complete. On account of the high price of seed, and the necessity of a thorough preparation of the soil, pastures and meadows are more often started from cuttings. To prepare cuttings the sod is gathered and cut into small pieces with a feed cutter or other similar machine, or a wooden block and hatchet can be used if only a small quantity is needed. Since most of the propagating stems are near the surface, it is necessary to shave off a layer of sod only an inch or two thick. If cuttings are wanted in large quantities, the sod can be plowed and the roots harrowed into windrows or piles. In all cases care should be taken not to allow the roots to get dry. The cuttings may be planted at any time of the year in the South except the coldest winter months, but the work is usually done in March. If a meadow is desired, more care should be taken in the planting of the cuttings to insure a level surface for the mowing machine. The cuttings are planted by dropping them at intervals of a foot or two in shallow furrows and covering with the next round of the plow. This can be done when the field is plowed, the cuttings being dropped every other round or every third round. Or the field can be prepared first and the cuttings dropped upon the surface and pressed in with the foot as they are planted. For meadows it is best to go over the land with a roller after planting. For pastures, when a smooth surface is not necessary, it is sufficient to plow shallow furrows every 2 to 4 feet and drop the cuttings therein, covering them with the foot or by turning the soil back over them with the plow.

Professor Tracy remarks: "So easily may Bermuda grass be propagated that good stands can be secured by scattering a dozen or more sods to the acre and cultivating the land in corn or cotton two or three years, when the grass becomes distributed in the field."

#### AS A SOIL BINDER.

On account of its creeping habit of growth, Bermuda grass is an excellent plant to prevent the washing of soils along ditches, ravines, embankments, or other similar places, and also to prevent the drifting of sand upon sand dunes. It has been used for the latter purpose with excellent results upon sand dunes of the coast of Southern California. It is not stout and vigorous enough to hold large shifting dunes, but it will cover sandy soil and prevent its blowing.

#### FOR LAWNS.

Bermuda is the best known lawn grass of the South. It has all the desirable qualities of a lawn grass except that of holding its color during the winter. It turns brown upon the approach of cold weather, and is rather late in becoming green in the spring. It is,

however, a good turf former, has a good color and a fine texture (fig. 2), and under the usual lawn treatment forms an ideal lawn, except during the winter months.

St. Lucie grass, as mentioned above, has, for the purposes of lawn making, certain advantages over the common variety, one of which is its remaining green later in winter. On account of its habit of growing more upon the surface it can be more easily eradicated, and is not so likely to become a pest.

The quickest method for the production of a lawn, if the extent of surface is not too great, is to transplant sod if that can be obtained. A lawn can, however, be formed by the methods given under meadows. To insure a perfect stand and uniform appearance, it may be necessary to sprinkle or to hand-weed. It should be kept closely mowed and rolled.

#### METHODS OF ERADICATION.

The very qualities which render Bermuda so valuable as a pasture

grass serve to make it an aggressive and pestiferous weed. On account of its tendency to spread and insinuate itself into land where it is not wanted, and to persist in fields which are to be used for other purposes, it has, in many cases, not been utilized to the extent that its good qualities would indicate. However, it can be eradicated from a field with compar-



FIG. 2.—A closely cut turf of Bermuda Grass (as seen from above, designed to show texture).

ative ease by proper cultivation. Since it will not thrive in the shade, it is only necessary to smother it out by some quick-growing crop. A method recommended by Southern agriculturists, and which may be modified to suit conditions, is to plow the land after the last crop of hay is cut, if the field is a meadow, or about this season if it is a pasture. Sow the field to oats, wheat, or other thick-growing crops. When this crop is harvested, plow the land immediately and plant to cowpeas. It is probably best to plant

these in drills and cultivate them until the vines meet, after which they will shade the ground and prevent the growth of Bermuda. Usually this treatment is sufficient to completely destroy the Bermuda; but if not, the process can be repeated.

#### FEEDING VALUE.

Bermuda grass is much relished by all kinds of stock, both when fresh and in the form of hay. Experience has shown that its milk-producing qualities, ton for ton, are fully equal to timothy. The feeding tables show that it contains more protein than most of the grasses commonly cultivated for forage.

#### SUMMARY.

(1) Bermuda grass is a native of the tropics, but widely introduced throughout the Southern States. It can not be successfully grown much north of Virginia.

(2) It is a creeping perennial, which will grow upon a great variety of soils and will endure extreme conditions of temperature and moisture.

(3) It is the best pasture grass for most parts of the South, especially upon poor land.

(4) On rich soil it produces an abundance of nutritious hay, two to four cuttings of which can be made each season.

(5) It can be started by thoroughly preparing the land and sowing in the spring about 6 to 8 pounds of seed per acre, pressing it in with a roller. It is usually more satisfactory to plant root-cuttings, or bits of sod 2 inches square, about 2 feet apart each way.

(6) It is a valuable soil binder, and is used to hold steep slopes and to prevent washing of soil or blowing of sand.

(7) It is the best-known lawn grass in the South, and is to be recommended for this purpose, especially the variety known as "St. Lucie grass."

(8) It can be eradicated from fields by proper cultivation of shading crops, especially cowpeas.

(9) Ton for ton the feeding value of its hay is equal to that of timothy. It is rich in protein, and is one of the most nutritious of the cultivated grasses.

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Approved:

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WASHINGTON, D. C., *March 21, 1901.*